Syntonizer

Newsletter of S.P.A.R.C. **July, 2001**

In This Issue: Shure's Icon of Broadcasting

Sytonizer

The ***Syntonizer*** is published quarterly at Vancouver, Canada, by The Society for the Preservation of Antique Radio in Canada, a charity registered under the laws of the Province of British Columbia, Canada.
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The Society exists for the purpose of preserving for future generations the electrical and radio-electronic communications artefacts that defined the 20th Century and to pass on the now rapidly diminishing expertise in their maintenance. Membership is open to all those interested in furthering those aims.

The Society operates a museum located on the campus of Riverview Hospital, Coquitlam, B.C. Call 604-777-1885 for up to date information on opening hours. Children are especially welcome. Special openings and extra display interpreters can be provided for large groups by prearrangement.

Tour and technical enquiries may be directed to the President. Enquiries regarding tax exempt financial donations and bequests should be directed to the Society's solicitors, Russell and Company, Suite 220, 4411 East Hastings Street, Vancouver, B.C., V5C 2K1.

Editorial Comment

With this issue of S.P.A.R.C.'s newsletter, a new editor takes the helm. Pressures of business have deprived us the services of our long time able editor and publisher, Bruce MacMillan. Thank you for all your efforts on our behalf, Bruce, we will miss your touch on the newsletter.

We Sparks have not lost Bruce altogether for Bruce is our President and continues in that office. You will find a message from him in that capacity in each issue of the newsletter.

Every editor and publisher has his own ideas about content, style and layout; of course he must or he would be valueless as an editor and publisher! The newsletter will see some changes, then, but some things will stay the same.

Changes

Future issues will see departments of the Museum and their curators featured. This quarter we hear from Peter Trill about the radio station that provides both programming to the equipment on display and remote facilities for off site events.

S.P.A.R.C. has collections in the areas of maritime mobile; antique tubes; broadcast receivers; military communication equipment; a vast library of period periodicals, texts and manuals; communications receivers; broadcast studio equipment (all in operation, too!); old television receivers; a superb cabinet restoration department and a service bench replete with tube type instruments worthy of the 'Fifties along with the techs to operate them all. Each of these areas and those who work in them will be featured in turn.

Something We Need

Those of us who have been employed by technical undertakings have seen the pattern time and again of salesman type personalities take business and managerial openings in those companies rather than technicians. We technoids generally have rude things to say about that when we see it happen but, in truth, it is inevitable. Technicians are, well, technicians; human skills are not our *forte*, now are they?

What we have at the Museum at the moment is plentiful and high powered technical help. Between us we could fix or restore just about any electronic communications equipment from rotary gap to d.d.s. Because we are technicians, what we don't have among us is that managerial talent required to keep us organized, to ensure our continued survival in the business sense and to "front" for the Museum with the media and with our new and businesslike landlord in Victoria.

Readers, somewhere out there is a Museum member with a business and management background who can aid the executive in these important areas himself or help us indirectly for the next few years somewhere in the background. Time and finances are pressing in upon the Museum; we need a business plan and other direction. Please consider helping us or even helping us indirectly by putting "the arm" on somebody who can assist with good business skills.

The Covers

This quarter's front cover shows the Shure Brothers' Model 55 Unidyne microphone. Every technology has its icon. To air travelers in the days of piston engines, the DC-3 said "commercial aviation", for instance. Well, in the days of tubes, Sure Brothers' Model 55 said "broadcast radio". Look at period pictures of famous faces making a speech or in performance and as often as not the frame will be shared by the unmistakable form of the Sure Unidyne that you see on this issue's cover. Our station engineer and board operator, Peter Trill, tells us about this rugged, reliable and universally trusted microphone in his column.

The back cover is a little poster, the first in a series. Use it to help your museum. Put it up where you work or play; it will, ahh, spark questions. Each poster will require a little explanation from you. Each question will create an opportunity for you to tell people about the all volunteer museum that you are a part of. Every three months you will have a fresh one to put up and new questions to answer!

JMN

Station Break

with

Peter Trill

This issue's cover shows the famous Shure model 55 "Unidyne" microphone. Outwardly sleek in design with a futuristic look well-suited for a 1930s science fiction movie, the 55 Series microphones from Shure Brothers today symbolize what comes to mind when someone says the word "microphone". Following its debut in Shure's 1939 catalog, the 55 Series enjoyed a decades-long history, which brought it to a point of professional and public recognition today rarely attained by any product, let alone in a group of audio components. The 55 Series' benchmark status was earned through its reputation as a workhorse, giving audio quality and reliability. Its unidirectional pickup pattern was achieved using an innovation: a single dynamic cartridge coupled to internal acoustic paths, phased such that cancellation occurred for sounds arriving from the rear. Until this time, such a pattern was obtained only in large, heavy, and expensive studio microphones that combined the outputs of ribbon and dynamic elements to produce a cardiod (or heart-shaped) pattern. The Shure design was the brainchild of the brilliant Ben Bauer.

Shortly after their introduction, the 55 Series microphones quickly became a mainstay in the world of audio professionals. Their reputation soon spread among microphone users as well. Celebrities, entertainers, and politicians came to rely upon them. They survived war-time service, and were familiar fixtures at critical, well-known moments in history. Scores of photographs, films, and videotapes show them in the company of kings, queens, presidents, and generals. They stood in front of Frank Sinatra and Doris Day during the Big Band era. Elvis embraced them too, as have countless other rock stars past and present. Today, some 62 years after their first appearance, 55 Series microphones are as popular and sought after as ever. And while the microphones have been subjected to internal changes over the years to keep them technologically up-to-date, they still retain the same external appearance of their youth.

We Have One, of Course

An early Shure 55 is presently the main console microphone in the museum's broadcast display. According to the manufacturer's notes, our example dates from 1947, after which time, the 55 had a multi-impedance switch on the rear. Also it has the original 1939 case size, rather than the dimensions of the 55S – the "small", released in 1951.

When someone outside the industry sees a Unidyne, it serves as a visual cue which can help transport them to a different era. Viewed from a design perspective, they exude all of the coolness of a '57 T-bird, Stratocaster guitar or a James Dean movie.

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A Thumbnail Sketch of the Broadcast Display

Over on one side of the museum floor is our Broadcast Studio display, which has a double purpose. As well as exhibiting some fine examples of studio equipment seen in radio stations of the 50s to the 70s, it is a working operation, broadcasting a low-power signal to the museum's vintage radios, playing an appropriate musical backdrop to our visitors as they move around the museum floor. Our present studio layout includes McCurdy disc players with Technics turntables, Ampex AG-440 tape machines, plus an Ampex 300 and a Magnecord PT-6, both from the early 50s, and two brands of tape "cart" machines. These sources all feed a Northern Electric 5420 control console, still performing very well at more than 45 years of age!

We've accumulated a wide variety of recordings that is our basis of the music being heard – 78-rpm disks from the 20s through the 50s, LP and 45 rpm records, and a large library of program tapes and broadcast transcriptions retired from CKNW. To make the effect complete, we intersperse radio commercials and station breaks that haven't been heard in decades. When you arrive in the parking lot, tune in to 1240 kHz.

One of our volunteers, Jack Watson, is encyclopedic when it comes to music recorded before 1950. Jack produces the program "Vintage Oldies", played from the studio during the museum's open hours.

We feel that some of our programming will be what the original owners of our radios might have listened to! The S.P.A.R.C. museum is planning to broadcast over the Internet on a regular basis. When we do, the link will appear on our website at www3.telus.net/radiomuseum.

[Peter is our Chief Board Operator, Chief Announcer, Chief Engineer, Chief Continuity Writer, well, our Station Chief generally. Ed.]

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Tube Talk

with

Neil Sutcliffe
(Troll of the Tube Vault)

Miniaturization

Well, as radio collectors, we all know about tubes. Early broadcast radios, other than crystal sets, were typically fitted with the ubiquitous '01 or similar. Large radios, large tubes. As one follows the development of broadcast radio for the consumer market, the radios begin to shrink from the large breadboard or coffin TRF sets, where wide spacing is an advantage, to more compact cathedrals and tombstones. The sets were shrinking, but the tubes—well, they had only shrunk somewhat from the pear shape to the shouldered ST bottle, but they are still very large. If you look through the museum, you will find some remarkably small sets with very large tubes in them. Indeed, one must respect the ingenuity of the designers to compact the set into such a small space and make it work reasonably reliably.

If you look at some of the early tubes, you will see (with difficulty due to the massive gettering (the silvery coating inside the bulb) obscuring the view) that on several early types the 'guts' are quite tiny. So why so large a bulb? Good question! In fact, Marconi made the V24 (an HF triode) in 1918, with a bulb about the size of a tall 9 pin miniature, with caps on both ends and on each side—there are some on a set in the radio room. In the early '20s, Western Electric (and Northern Electric) made the 215A, commonly referred to as the 'peanut tube'. About the size of a 9 pin miniature, this was used in battery sets of the mid '20s.

In the mid '30s, in the UK, MOV and Hivac brought out subminiatures for hearing aids with the Hivac ones being 1cm diameter and 2.4 to 3 cm long, and offering triodes, tetrodes, pentodes and diode-triodes.

Back in the US, in 1934, RCA developed some VHF/UHF tubes known as 'acorns' and, while these were not terrific performers by later standards, they had several important innovations. They were baseless, using heavy wires through the equatorial seal as the terminal pins. They were 'press-less' in that the bulb provided both the seal and the element structural support, and they were very small and precise in both the internal structure, and the bulb (about the size of an acorn). In 1935, RCA brought out the metal octal, which was just the same element structure as the then current 'large pin' glass tubes, but inserted into a very compact metal envelope. An incensed Philco commissioned their supplier, Sylvania, to come up with something innovative to compete, so, in 1938-9, the 'loktal' appeared, with its integral seal and contact pin. Since RCA was experiencing some problems with the glass sealed feedthroughs on the metal tube, the base idea of the loktal replaced the 8 seals of the early octals with a single 8 lead button seal, resolving the problem. It appears that some bright soul at RCA realised that one could use that button seal as the bottom of a small glass tube, and, in 1939, the 7 pin miniature appeared as the suite for portables: 1R5, 1S4, 1T4 and 1U5.

As war clouds loomed for the US, in 1941 the acorn 'guts' were transplanted to the 7 pin miniature becoming the 9001, 2 and 3 for use in radar and other UHF equipment. Raytheon also developed their CK series of subminiatures from 1940 and on through the war and, with the similar Sylvania products, were used in the famous 'proximity fuzes'. The first indirectly heated tubes designed specifically as 7 pin miniatures were the ubiquitous 6C4, 6J6 and the 6AC5 in 1942.

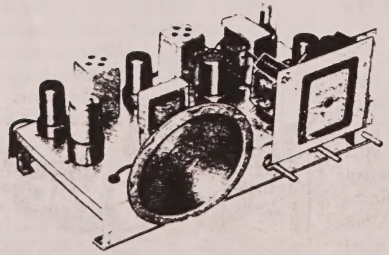
With the vast production capacity for the 7 pin miniature at the end of the war, it was inevitable that the miniature would supplant the larger octal in consumer goods. A vast array of new packages (9 pin, compactron, etc.) and types followed, right up to the end of consumer tube use in the mid '60s.

Post war, the only really "new" design and probably the smallest consumer tube is the 'nuvistor' from the late '50s which is only slightly larger than a TO-5 metal transistor.

Reference: John W Stokes: *70 Years of Radio Tubes and Valves*; Vestal Press; 1992; ISBN 0-911572-60-0

T10-1199 & T10-1199A

SUPERHET KIT, B. C. and S. W. BANDS



Frequencies covered by this broadcast and short-wave receiver are 550 to 1600 kilocycles and 6 to 18 megacycles. The shortwave band includes foreign stations, government, commercial, and amateur services. Fully illustrated instructions make this set easy to assemble with only pliers, screwdriver, and soldering iron.

Circuit stability and operating ease are achieved by high-quality components and careful circuit design. A filter choke provides hum-free output without power loss and an I.F. wave trap eliminates troublesome image interference. Large 5-inch speaker for extended audio response without distortion. Tubes employed are 12SK7 R-F amplifier, 12SA7 oscillator-mixer, 12SK7 I.F. amplifier, 12SQ7 detector, AVC, and audio amplifier, 35L6GT beam power output, plus a 35Z5GT rectifier. Pilot light for dial illumination. 110 volt, DC or 50-60 cycle AC operation.

No. T10-1199 Superhet 2-Band Kit with speaker and tubes, (less cabinet, wire and solder)

No. T10-1199A Essential Kit For Above (less cabinet, tubes, wire and solder)

A Fusty Delight

Editor

Calling all nerds! The nerdy kids of today disappear into their bedrooms to surf the 'net. We nerdy kids of the tube generation disappeared into our bedrooms to surf magazines. Gee-whiz items such as *Popular Mechanics* and *Popular Electronics* and weightier material such as *Scientific American* offered us an escape into another world. Those magazine days may be gone forever elsewhere but not at S.P.A.R.C.

The internet and a more sophisticated but less literate youth have put an end to that innocent pastime of magazine surfing. We S.P.A.R.C. members can yet relive those days of yore, they still exist out here. They are preserved in the library. Within its confines, the relentless, heartless march of time has been arrested. The year 1940 is still there, 1950 is still there and 1960 is still there. Tubes rule. You might even find a book about King Spark. Visit your youth; indulge yourself, borrow a few magazines from the bulging stacks. The place is a fusty delight!

In these pages each issue from now on, your editor or a guest editor will introduce some of the thousands upon thousands of items in those stacks.

This time your editor himself takes down a little book put out by Gernsback in 1938. "Gernsback" was a name generations of us technical magazine nerds knew well. This little book; a pamphlet, really; carries with it both the travail and the hope of the Depression era. At ten cents for 32 tiny pages of the cheapest paper it encapsulates the Depression. Ten cents in 1938 would have bought the magazine's purchaser a tolerable breakfast in some places so it's price is about the same as a slick magazine of today. At the time, though, cash was something most people just did not have. Buying this would have been a serious decision.

The articles in this little magazine are redolent of the times, hard times.

Here's the schematic of the "12,500 Miler". It's a cheap and cheerful delight for those with no cash. Yes, the schematic is out of kilter, as is the magazine's cover, beside it. It was a *cheap* magazine, you understand, not a *slick* magazine.

Not a penny is wasted on frills here. It is a simple and effective little circuit. In the hands of a reasonably careful operator who had a hundred feet of wire in the air and a water pipe ground, it would have given the world wide coverage suggested by the name. Remember, please, the bands of Thirties were not knee deep from end to end in megawatt short wave stations and contesting hams. In fact, it was just about now that short wave broadcasting had begun its boom.

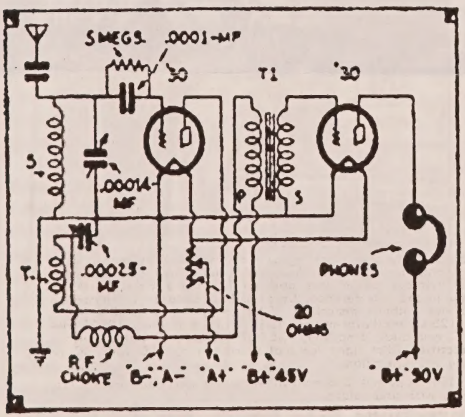
Mr. W.C. Doerle opens his article on this, the first of four radio circuits, with this delightful introduction, redolent of an age passed:

"What the heck's the idea of wasting power, of blasting out ear-drums, of going 'bugs' with the performance of a costly short-wave receiver, when you can build a two-tube outfit that gets signals from the 12,500 mile meridian? Why, there is nothing to brag about when you 'log' a bunch of stations with a powerful receiver; but listen to a man who 'pets' a two-tube set, and then you get the 'thrill of a lifetime'". Ah, technical writing does not see your style today; Mr. Doerle, we miss you.

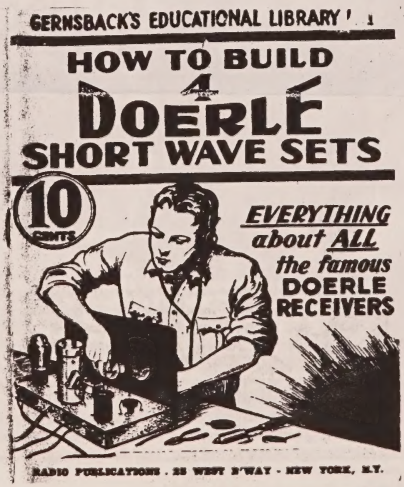
Under that heading of "Nothing Wasted", by the way, kindly note the headphone circuit, you solid state techs. There is nothing unusual here. It was quite common practice at the time to put high impedance (say 3,000Ohms) headphones right in series with the plate supply (Vcc!) to the final amplifier. It was cheap, that's what it was. No money was wasted in a load resistor and capacitor or in a transformer, either. No power was wasted from the expensive "B" battery by running current through that load resistor. A side benefit arose during dx sessions. If the operator kept his head phones on too long into the night, the cups became moist from the perspiration trapped in them. At that point the B+ leakage through the inferior insulation of the era and onto his ears served to remind him it was time to take off the "cans" and retire to bed!

There is enough old hardware on the loose out at S.P.A.R.C. to make one of these receivers. If somebody can talk Neil Sutcliffe, Troll of The Tube Vault, into loaning out of a couple of type '30 bottles; he could make himself one of these rigs on a Sunday. To honour the traditions, dry cells should be used, not a new fangled battery eliminator. The "A" voltage is easy with "telephone cells" or "D" cells and the "B" voltages can be made up from a stack of nine volt transistor radio batteries.

Let's just see if one of those technical, *Popular Science* surfing, nerdy kids is still around!



Schematic diagram of "12,500 miler"



King Spark!

"Grown now to full maturity, developed and perfected by years of pre-war and war experience, it reached its highest peak in the succeeding eighteen months. Glorious old sparks! Night after night they boomed and echoed down the air lanes. Night after night the mighty chorus swelled, by ones, by twos by dozens, until the crescendo thunder of their Stentor bellowings shook and jarred the very Universe! A thousand voices clamored for attention. Five hundred-cycles' s high metallic ring. The resonant organ basso of the sixty-cycle 'sych'. The harsh resounding snarl of the straight rotary.

"Character: Nervous, impatient sparks, hurrying petulantly. Clean-cut business-like sparks batting steadily along at a thirty-word clip. Good-natured sparks that drawled lazily and ended in a throaty chuckle as the gap coasted down- hill for the sign-off.

"Survival of the fittest. Higher and higher powers were the order of the day.

"The race was on, and devil take the hindmost.

"Interference.

"Lord, what interference!

"Bedlam!

"Well, it could not be Utopia."

-Bulong, *The Story of the A.R.R.L.* quoted by DeSoto in *200 Meters and Down.*

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King Spark built radio communications, particularly maritime mobile communication where He saved thousands of lives, only to see Himself then promptly hustled off the scene in a most undignified haste by the pip-squeak, dainty, high tech., unromantic high vacuum tube of Mr. Langmuir.

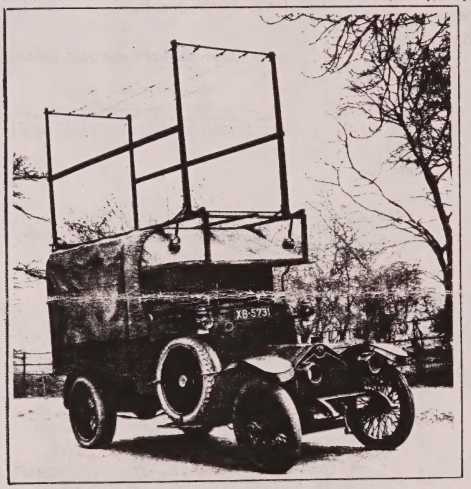
Budlong's description of the chaos that reigned on the air after the Great War contains a delightful detail unknown to today's operators who have had exposure only to that high tech. sprog of modernity, c.w. technique. Marv Wilson, a young amateur spark operator in that great interval after the War, related to your editor very many years ago the following detail of proper deportment and it has turned up in subsequent written material including the item above.

In those grand days of the almighty rotary gap there was tradition to be observed. When signing off, an operator always held the key down for a long last "dah". While leaving power connected to the spark transformer, power was removed from the rotary motor. In that way the station was closed with style, with panache; the spark repetition rate gradually grumbling off downhill to unreadability. King Spark was to be accorded a certain dignity as he was retired from the æther.

Sigh! The Museum boasts a "compact", luggable quenched gap station complete with detector and preselector and two portable open gaps, but, as yet, alas, not a rotary. There are some "rotaries" still around. Eyes open, everybody, the Museum is not complete without King Spark's ultimate expression, the mighty rotary gap transmitter. J.M.N.

The Radio Police Car

Radio News, January, 1924]



In 1923, the British police were already exploring mobile radio. This was a highly advanced radiotelephone installation under development by Scotland Yard. The entire box of the "English Police Automobile" is occupied by pieces of radio equipment, batteries and a full time operator to keep the assemblage functioning. That magnificent bedstead flat top can be folded down. Staff Bku, a highly placed source in the Mounted Police Communications Department, has revealed to the editor that as part of the recent drastic cost cutting measures in his organisation, this vehicle and its radio equipment are receiving renewed attention at the highest levels in Ottawa. "This was tube technology, of course" he said "and the Commissioner may opt for the simplicity and lower cost of spark."

"Mr. Paul Johnson said if I were in need of further service he would come again right away." *Radio News*, January 1924]

"Hello, Radio Repair? Why is it that after six trips my radio still doesn't work well?"

RADIO NEWS
H. GERNSBACK—Editor and Publisher
ROBERT E. LACAULT, Associate Editor
EDITORIAL AND GENERAL OFFICES, 53 PARK PLACE, NEW YORK
Vol. 5 JANUARY, 1924 No. 7

Cabinetry

with

Bruce Russell

While refinishing a beautiful Airplane deco, the orange plastic 1940's table model that is now on display at the Museum, I was dismayed at the condition of the grill cloths. This radio has five grill cloths, front, back, sides and top. The cloths were intact but had several stains including what appeared to be melted glue or tar on one of them.

I cleaned each up as best I could but the final result was not satisfactory. The cloths did not look strong enough to withstand conventional washing or dry cleaning. The choice for completing the receiver was to replace them or to put them back soiled.

Since no acceptable substitute cloth could be found, I was facing the unpalatable choice of either installing cloth that was not original and thereby spoiling the whole effect created by the designer of this period piece or reinstalling the soiled speaker cloths.

I couldn't live with either of these options but by experimenting, I discovered a middle way: covering the stain with a minimum of damage and creating a nice blend at the same time. This technique works on gold cloth for certain but other colours might be used if you can get a decent colour match. Try a little corner first in case things go terribly wrong.

This is what to do to cover a stain. Take a small, flat stir stick like a Popsicle stick and ladle out onto the stain some glitter, gold metallic paint powder or the gold paste added to lacquer to produce gold paint.

Spread the gold powder or gold paste around and work it into the stained area of the cloth with the stick. It should adhere quite nicely and it will blend into the adjacent area if the original cloth still is a decent colour. In the case of this Airplane radio, the colour was a mildly faded gold.

After working in the powder or paste, blow off or scrape off the excess and repeat the process as required to mask the stain. The result with the Airplane radio was a very passable patch up. It preserved the original cloth and the design on it, covered the stain and was easily done.

The final job may be sealed with a sealer but I'd suggest the restorer leave the cloth soft.

Something Extra Special

When you come out to the Museum next time enquire about "The Scott". The Scott is a spectacular restoration of a very sophisticated broadcast receiver of the early 'Thirties which has just returned to the Museum. For those who enjoy cabinetry, The Scott has it; a real flavour of art deco executed in beautiful veneer.

The entire metal work of the chassis and all fittings is chrome plated. That's how it came from the factory, that's not how it was found, but that is how it is again now. This is not a "no go show boat", either. Everything down to the projection screen dial and signal strength meter works just as it did *68 years ago*.

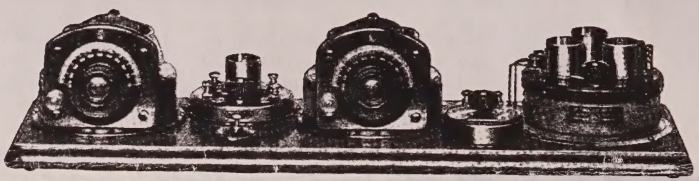
The design of the circuit was of such quality that the receiver is entirely competent in today's a.m. broadcast band now populated end to end by high powered transmitters and this, remember, was designed long, long before fancy i.f. filters. It's an example of rigorous engineering, the utmost state of the art in 1933 and it is operating again at S.P.A.R.C. receiving our in house broadcast radio station.

When you find The Scott, ask if Brent Hilpert is on duty, let him tell you about his baby!

We have...

ATWATER KENT

RADIO EQUIPMENT



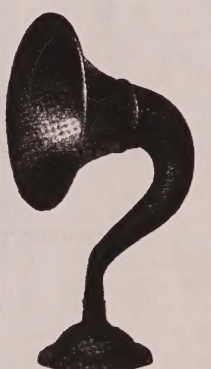
Atwater Kent Model 9 Receiving Set

ATWATER KENT Receiving Sets are a truly remarkable achievement. Their wide range of operation; the volume and clearness of tones obtained from distant points, together with the ease with which desired broadcasting stations can be tuned in are the outstanding features of their unusual performance.

The ATWATER KENT Loud Speaker will give you a new conception of clear reproduction:—the true gift of the broadcasting artist is brought undistorted into your home.

If you are now working with a one-tube set, the ATWATER KENT 2-Stage Amplifier will give you the necessary volume to use a loud speaker.

ATWATER KENT Radio Equipment includes complete sets and every instrument necessary for the assembling of complete sets from tuning unit to loud speaker.



The Atwater Kent Loud Speaker

2-Stage Amplifier

Literature describing the entire line of Atwater Kent Radio Sets and Parts sent on request

ATWATER KENT MANUFACTURING COMPANY, PHILADELPHIA, PA.
4943 STENTON AVENUE

...the technology!
at S.P.A.R.C., 604-618-7148